

Incidental dental anomalies and jawbone pathologies in Turkish pediatric patients of the Eastern Mediterranean region

Incidental dental anomalies and jawbone pathologies

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Abstract

Aim: The present study aimed to examine the prevalence of incidental dental anomalies and jawbone pathologies in a group of pediatric patients from the Eastern Mediterranean region.

Material and Methods: Sociodemographic data of the patients were extracted from digital automation records. Moreover, panoramic radiography archives of pediatric patients, who applied to the School of Dentistry, Sütçü İmam University for examination for any reason, were scanned so that dental anomalies and jawbone pathologies were determined. The study was conducted by an oral and maxillofacial radiologist.

Results: The study examined the panoramic radiographs of 1432 pediatric patients aged 5-17 years. The most prevalent incidental dental anomaly and jawbone pathology were impacted teeth (4.8%) and periapical lesion (21.8%), respectively. Nevertheless, while the least prevalent incidental dental anomalies were ectopic teeth (0.2%), taurodontism, and macrodontia (0.6%), we found the least prevalent pathological finding to be odontoma (0.2%).

Discussion: This retrospective study on a group of pediatric patients from the Eastern Mediterranean region revealed that the most prevalent dental anomaly was impacted teeth, while the most prevalent pathology was periapical lesion. Ultimately, in the early detection of such findings, all regions should be routinely evaluated in panoramic radiographs.

Keywords

Panoramic Radiography, Dental Anomalies, Pathologies, Incidental Findings

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Introduction

In dental practice, radiographs are used in addition to clinical examination to confirm the clinical diagnosis and plan the treatment. In this sense, panoramic radiography is used to visualize the entire maxilla, mandibular, and other surrounding structures with the help of a single image. Its greatest advantage is to offer a straight, single image [1].

Panoramic radiography is a favored imaging method for pediatric patient groups as most children can tolerate it effortlessly due to its noninvasive features. It also provides comprehensive information on the dentomaxillofacial region, including erupted and unerupted teeth, tooth germ development, and various dental anomalies in the maxilla and mandibula. The information and clinical findings through panoramic radiographs facilitate the diagnosis process [2].

Dental anomalies are cases of difference in the number (hypodontia and hyperdontia), size (microdontia and macrodontia), shape (taurodontism and dilaceration), structure (amelogenesis imperfecta and dentin dysplasia), and persistence (ectopic and embedded) of teeth and affect both primary and permanent dentition. Dental anomalies may be congenital, developmental, or acquired [3]. Besides, like adults, it is known that lesions such as radicular cyst, odontoma and ameloblastoma develop in pediatric patients as in adults [4].

Lesions and dental anomalies in children's jawbones may alter tooth eruption, cause abnormal occlusion, and, in advanced cases, affect the aesthetics and their social lives. If such alterations are detected early, they are more likely to be treated surgically and orthodontically; thus, their functional, psychosocial, and financial problems might be reduced [5].

In the literature, it has been reported that panoramic radiographs of pediatric patients at the first admission could enable the detection of incidental findings other than the findings related to the main complaints, and early treatment of such lesions might help prevent the occurrence of complications [6].

It is well-known that the incidences of dental anomalies and pathologies vary by society [1,7,8,9,10].

Overall, the present study aimed to examine the prevalence of incidental dental anomalies and jawbone pathologies in a group of pediatric patients from the Eastern Mediterranean region of Turkey.

Material and Methods

In this study, we went through panoramic x-ray archives of pediatric patients, who applied to the School of Dentistry, Sütçü İmam University for examination for any reason. The research was a cross-sectional, retrospective study and granted with ethical permission by the Clinical Research Ethics Committee, School of Medicine, Kahramanmaraş Sütçü İmam University (2020/01).

Panoramic radiographs with the fine image quality of patients under 18 years were included in the study. Radiographs of syndromic patients (Down syndrome, Ectodermal dysplasia, etc.) and patients with cleft lip and palate, radiographs with poor image quality and artifacts affecting the image evaluation, and third molars were excluded from the study.

All radiographs were obtained with the GENDEX, GDP -700 model panoramic X-ray device with 66 kV, 6.3 mA, and 14

seconds exposure time in the pediatric patient module.

Sociodemographic data of the patients were extracted from digital automation records. The presence or absence of dental anomalies and jawbone pathologies were determined by examining the panoramic radiographs. Findings were categorized as dental anomalies (supernumerary teeth, hypodontia, impacted teeth, mesiodens, root dilaceration, microdontia, macrodontia, taurodontism, and ectopic teeth), lesions in the jawbones (periapical lesion, odontomas, root resorption), and other (fracture line) (Figure 1, 2, 3, 4). The obtained results were tabulated in the Excel program and then



Figure 1. Supernumerary tooth in maxilla anterior (Mesiodens)



Figure 2. Supernumerary teeth in the right and left premolar regions of the mandible



Figure 3. Ectopic canine tooth in anterior region of mandible



Figure 4. Missing of right and left second premolar germs in mandible (Hypodontia)

analyzed statistically. The definitions in the book of White and Pharoah [3] were considered in the diagnoses of anomalies and lesions.

An oral and maxillofacial radiologist evaluated the panoramic radiographs.

Results

In the study, panoramic radiographs of 1,432 pediatric patients

Table 1. Descriptive analyses of demographic and radiographic characteristics of the subjects (n=1432)

Demographic and radiographic characteristics	n	%
Age		
x ≤ 6	104	7.3%
6 <x ≤12	632	44.1%
12 <x ≤17	696	48.6%
Gender		
Male	576	40.2%
Female	856	59.8%
Impacted teeth		
Present	69	4.8%
Absent	1365	95.2%
Other Supernumerary teeth		
Present	15	1.0%
Absent	1417	99.0%
Periapical lesion		
Present	312	21.8%
Absent	1120	78.2%
Odontoma		
Present	3	0.2%
Absent	1429	99.8%
Mesiodens		
Present	52	3.6%
Absent	1380	96.4%
Taurodontism		
Present	8	0.6%
Absent	1424	99.4%
Ectopic teeth		
Present	3	0.2%
Absent	1429	99.8%
Root dilaceration		
Present	24	1.7%
Absent	1408	98.3%
Hypodontia		
Present	40	2.8%
Absent	1392	97.2%
Root resorption		
Present	16	1.1%
Absent	1416	98.9%
Microdontia		
Present	18	1.3%
Absent	1414	98.7%
Macrodontia		
Present	8	0.6%
Absent	1424	99.4%
Fracture line		
Present	24	1.7%
Absent	1408	98.3%

aged 5-17 years were evaluated in the study. Of whom, 856 (59.8%) were females and 576 (40.2%) were males. Sociodemographic characteristics of the patients are shown in Table 1.

The incidence of at least one dental anomaly was found to be 16.8%. The most prevalent incidental dental anomaly and jawbone pathology were impacted teeth (4.8%) and periapical lesion (21.8%), respectively. Nevertheless, while the least prevalent incidental dental anomalies were ectopic teeth (0.2%), taurodontism, macrodontia (0,6%) and microdontia (1.3%), we found the least prevalent pathological finding to be odontoma (0.2%). Table 1 demonstrates the descriptive analysis of the incidental findings.

The incidence of impacted teeth was found to be significantly higher in males (p=0.005) and the 12-17 age group (p<0.001). Besides, supernumerary teeth showed themselves significantly more prevalent in the group aged 12-17 years (p<0.001). The males and the group aged 12-17 years had significantly higher incidence of periapical lesions (p <0.005). Finally, we found the incidence of mesiodens to be significantly higher in the group aged 6-12 years (p=0.003).

The incidence of taurodontism was significantly higher in females and the group aged 6-12 years (p <0.005). In addition,

Table 2. Relationship of findings with age and gender

Factors	Gender			Age			p
	Male	Female	p	x≤6	6<x≤12	12<x≤17	
Impacted teeth							
Present	56.5%	43.5%	0.005	0.0%	27.5%	72.5%	<.001
Absent	39.4%	60.6%		7.6%	49.7%	42.7%	
Other Supernumerary teeth							
Present	53.3%	46.7%	0.298	0.0%	0.0%	100.0%	<.001
Absent	40.1%	59.9%		7.3%	44.6%	48.1%	
Periapical lesion							
Present	53.8%	46.2%	0.016	10.3%	38.5%	51.3%	0.015
Absent	61.4%	38.6%		6.4%	45.7%	47.9%	
Odontoma							
Present	0.0%	100.0%	0.155	0.0%	100.0%	0.0%	0.149
Absent	40.3%	59.7%		7.3%	44.0%	48.7%	
Mesiodens							
Present	42.3%	57.7%	0.755	0.0%	65.4%	34.6%	0.003
Absent	40.1%	59.9%		7.5%	43.3%	49.1%	
Taurodontism							
Present	100.0%	0.0%	0.020	0.0%	100.0%	0.0%	0.006
Absent	59.6%	40.4%		7.3%	43.8%	48.9%	
Ectopic teeth							
Present	100.0%	0.0%	0.155	0.0%	0.0%	100.0%	0.149
Absent	59.7%	40.3%		48.7%	7.3%	44.0%	
Root dilaceration							
Present	0.0%	100.0%	<.001	0.0%	0.0%	100.0%	<.001
Absent	40.9%	59.1%		7.4%	44.9%	47.7%	
Hypodontia							
Present	40.0%	60.0%	0.977	0.0%	60.0%	40.0%	0.051
Absent	40.2%	59.8%		7.5%	43.7%	48.9%	
Root resorption							
Present	50.0%	50.0%	0.423	0.0%	0.0%	100.0%	<.001
Absent	40.1%	59.9%		7.3%	44.6%	48.0%	

we discovered dilaceration to be significantly higher in females and the group aged 12-17 years ($p < 0.005$). There was significantly higher root resorption in the 12-17 age group ($p < 0.001$). While microdontia was significantly more prevalent in the 6-12 age group ($p < 0.005$), the females and the group aged 6-12 years had significantly more macrodontia ($p < 0.005$). Finally, the incidence of fracture lines was significantly higher in males ($p = 0.008$). Table 2 shows the relationships of the incidental findings by gender and age.

Discussion

In the literature, there are studies evaluating the incidences of dental anomalies and pathologies in pediatric patient groups in different geographies [1,7,8,9,10,11].

In our study, the incidence of at least one dental anomaly was found to be 16.8%. Previously, Bawazir et al. [7] found it to be 29.8% in their study with 1,311 Arabic children aged 6-20 years, while Haugland et al. [8] discovered it to be 28.2% in their study with 500 Norwegian children aged 12 years 11. Also, in their study with Indian students aged 14-17 years, Gupta et al. [9] reported that 29.8% of the participants had at least one anomaly.

In Turkey, Özveren et al. [10] revealed that the incidence of dental anomalies was 10% in Thracian child patients, while it was 11.29% in the study of Sümer et al. [11] conducted with 540 children aged 6-13 years. The differences in the results of the study, the types of dental anomalies included in the study, age group differences in the sample, the sample sizes and the differences in the geographies might be explained. Besides, the diagnostic criteria used in some studies are not clear, which might cause such differences.

In this study, the most prevalent jawbone pathology was found to be periapical lesion (21.8%). In the study conducted by Namdar et al. [12] on a similar age group, the rate of apical osteitis was reported to be 35.52%. Moreover, in this study, the incidence of periapical lesions was significantly higher in the 12-17 age group and males. Reis et al. [13] reported that the radiolucent changes in the jawbone could occur in patients aged around ten years but determined no significance by gender.

The most prevalent dental anomaly in our study was impacted teeth (4.8%). In addition, we found the incidence of impacted teeth was found to be significantly higher in the 12-17 age group. Unlike this study, Bawazir et al. [7] reported that impacted teeth (3.2%) were the fourth most prevalent dental anomaly. Nevertheless, similar to this study, Shokri et al. [14] found that the most prevalent anomaly was impacted teeth (45.5%) among the patients aged 7-35 years. This rate is considerably higher than what was found in this study, which may be due to the high mean age and the inclusion of the third molar teeth in that study [14].

The incidence of supernumerary teeth (mesiodens and other supernumerary teeth) was 4.6% in our study. Similarly, this incidence was found to be 4.25% in the study of Sümer et al. [11]. In the literature, the incidence of supernumerary teeth was reported to be more in males, but the results were not significant [13]. In this study, no statistical difference was determined according to gender.

In this study, the incidence of mesiodens was 3.6%. In parallel

with this study, mesiodens was observed at a rate of 3.94% in the study of Namder et al. [12]. However, the incidence of mesiodens was reported to be 0.1% in the study of Aren et al. with 58,142 pediatric patients [15]. While mesiodens is quite rare in primary dentition, it is considered to be the most prevalent dental anomaly in permanent dentition [15,16]. In parallel with the previous findings, we found the incidence of mesiodens increased significantly in the group aged 12 years, which is likely because the primary dentition period is completed at this age.

In this study, the incidence of hypodontia was 2.8%, and it was determined as the third most prevalent dental anomaly. The incidence of hypodontia was 5.34% in the study of Özveren et al. [10], while it was 5.37% in the study of Sümer et al. [11]. Bawazir et al. [7] reported that hypodontia was the most prevalent finding among 1,311 children at the rate of 9.7%. In their study with 13,220 panoramic radiographs, Vibhute et al. [17] revealed that the most prevalent anomaly in orthodontic patients aged 8-14 years was hypodontia, at the rate of 27.7%. There may be an increase in the incidence of dental anomalies in orthodontic patients.

The incidence of root dilaceration was found to be 1.7% in this study. Unlike this study, Özveren et al. [10] found root dilaceration in only one lateral tooth among 1,759 children. It was also reported to be 4.3% in a study with a Turkish sample in the 15-65 age group. Although root dilaceration can be observed in all teeth, it is most prevalent in mandibular third molars [18]. The exclusion of third molar teeth may explain the low incidence of this anomaly in this study. Besides, in contrast to this study, Karataş et al. [19] determined that it was significantly more prevalent in males in an adult patient group. Root dilaceration is rarely seen in the primary dentition; therefore, it was determined to be more prevalent in the patients aged 12-17 years in this study.

In this study, the rate of incidental fractures in the jawbones was 1.7% and significantly more prevalent in males. In parallel to the present research, Tanaka et al. [20] observed that boys had 2 times more fractures than girls and that the highest incidence was in boys over 13 years of age.

In this study, compared to other anomalies, non-prevalent incidental findings included microdontia (1.3%), root resorption (1.1%), taurodontism (0.6%), ectopic teeth (0.2%), macrodontia (0.6%), and odontoma (0.2%). In parallel with this study, Bawazir et al. [7] discovered that root resorption (0.2%), taurodontism (0.8%), and macrodontia (0.6) were relatively rare compared to other anomalies. In the study of Özveren et al. [10], taurodontism (1.56%), ectopic teeth (0.4%), macrodontia (0.45%), and microdontia (0.45%) were found to be other anomalies.

Araz et al. [21] reported that the prevalences of microdontia and macrodontia were not significantly different between girls and boys. Nevertheless, in this study macrodontia was found to be significantly more prevalent in females and the group aged 6-12 years.

In this study, taurodontism was significantly more prevalent among females, which was also the case in the study of Mac Donald et al. [22]. Yet, some studies could not find a significant difference between children by gender [23]. In addition, the literature generally suggests that taurodontism and the X

chromosome are associated, which leads the prevalence to increase in females and permanent dentition to be more affected [24]. This study could also not reach any taurodontism in the primary dentition.

Conclusions

This retrospective study on a group of children from the Eastern Mediterranean region revealed that the most prevalent dental anomaly was impacted teeth, while the most prevalent pathology was periapical lesion. Ultimately, it is recommended to routinely evaluate the other regions as well as the main complaints in the panoramic radiographs of pediatric patients who are first admitted to the clinic. Early detection of such findings may facilitate treatment and prevent possible future complications.

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Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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References

- Charan VS, Mathew MG. Panoramic radiograph and its importance in pediatric dentistry-A retrospective study. *Drug Invent Today*. 2020;7:1236-39.
- Anthonappa RP, King NM, Rabie AB, Mallineni SK. Reliability of panoramic radiographs for identifying supernumerary teeth in children. *Int J Paediatr Dent*. 2012;22:37-43.
- White SC, Pharoah MJ. *Oral radiology: Principles and interpretation*. 5th ed. St Louis: Mosby; 2004;330-365.
- Sousa FB, Etges A, Correa L, Mesquita RA, de Araujo NS. Pediatric oral lesions: a 15-year review from Sao Paulo, Brazil. *J Clin Pediatr Dent*. 2002;26:413-418.
- Sharma G, Johal AS, Liversidge HM. Predicting Agensis of the Mandibular Second Premolar from Adjacent Teeth. *PLOS ONE*. 2015;10:1-8.
- Asaumi JI, Hisatomi M, Yanagi Y, Unetsubo T, Maki Y, Matsuzaki H, et al. Evaluation of panoramic radiographs taken at the initial visit at a department of paediatric dentistry. *Dentomaxillofac Radiol*. 2008;37:6, 340-343.
- Bawazir M, Alyousef T, El-Housseiny AA. Incidental Dental Anomalies in Pediatric Dental Patients Detected by Panoramic Radiographs-A Retrospective Study. *Saudi J Oral Dent Res*. 2019;4:87-92.
- Haugland L, Storesund T, Vaska V.R. Prevalence of dental anomalies in Norwegian school children. *OJST*. 2013;3:329-333.
- Gupta SK., Saxena P, Jain S, Jain D. Prevalence and distribution of selected developmental dental anomalies in an Indian population. *J Oral Sci*. 2011;53:231-238.
- Özveren N, Atay MT. Types and Prevalence of Dental Anomaly in Turkish Pediatric Patients of Trakya Region. *Turkiye Klin J Dental Sci*. 2020;26:362-70.
- Sumer AP, Akça T, Köprülü H. Dental anomalies in children: panoramic radiographic evaluation. *Ondokuz Mayıs Univ Dis Hekim Fak Derg*. 2004;5(2):81-4.
- Namdar Pekiner F, Borahan MO, Gümrü B, Aytugur E. Rate of incidental findings of pathology and dental anomalies in paediatric patients: A radiographic study. *MÜSBED*. 2011;1:112-6.
- Reis JC, Fraga MAA, DeAzevedo-Vaz SL, Miotto MHMB, Perreira TCR. Alterations in Panoramic Radiographies in Children. *Rev Gauch Odontol*. 2020;68:20200073.
- Shokri A, Poorolajal J, Khajeh S et al. Prevalence of dental anomalies among 7 to 35 year-old people in Hamadan, Iran in 2012-2013 as observed using panoramic radiographs. *Imaging Sci Dent*. 2014;44:7-13.
- Aren G, Erdem AP, Onur ÖD, Ak G. The prevalence of mesiodens in a group of non-syndromic Turkish children: a radiographic study. *Eur Oral Res*. 2018;52:162-166.

- Ray D, Bhattacharya B, Sarkar S, Das G. Erupted maxillary conical mesiodens in deciduous dentition in a Bengali girl - A case report. *J Indian Soc Pedod Prev Dent*. 2005;23:153-5.
- Vibhute AH, Vibhute NA, Daule RP. Prevalence of dental anomalies in pretreatment orthodontic patients in Western Maharashtra, India: An epidemiological study. *J Orthod Res*. 2013;1:66-9.
- Miloglu O, Cakici F, Caglayan F, Yilmaz AB, Demirkaya F. The prevalence of root dilacerations in a Turkish population. *Med Oral Patol Oral Cir Bucal*. 2010;1:441-444.
- Karadas, M, Tahan E, Arslan H, Erdogan S. Prevalence of root dilaceration in a subpopulation of northeast Turkey. *Turkiye Klin J Dent Sci*. 2015;21:71-6.
- Tanaka N, Uchide N, Suzuki K, Tashiro T, Tomitsuka K, Kimijima Y, et al. Maxillofacial fractures in children. *J Craniomaxillofac Surg*. 1993;21:289-293
- Araz M, Güven Y, Bozdoğan E, Aktas A, Aktören O. Dental Anomalies Of Permanent Incisors And Premolars. *Eur Oral Res*. 2011;45:23-28.
- Mac Donald-Jankowski DS, Li TT. Taurodontism in a young adult Chinese population. *Dentomaxillofac Radiol*. 1993;22:140-4.
- Jamshidi D, Tofangchiha M, Jafari Pozve N, Mohammadpour M, Nouri B, Hosseinzadeh K. Prevalence of Taurodont Molars in a Selected Iranian Adult Population. *Iran Endod J*. 2017;12:282-287.
- Varrela J, Alvesalo L J M. Taurodontism in 45, X females. *J Dent Res*. 1990;69:494-5.

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